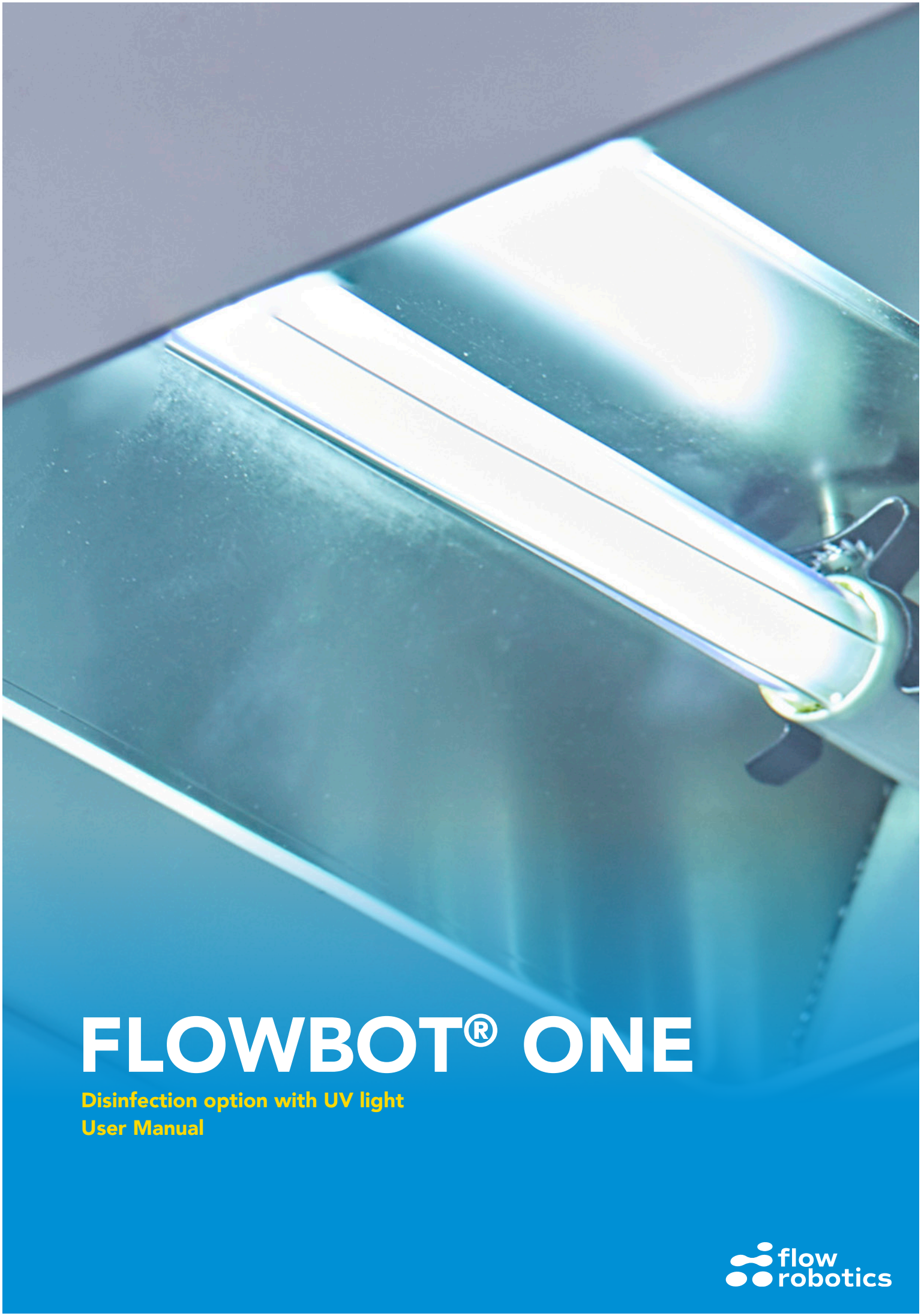
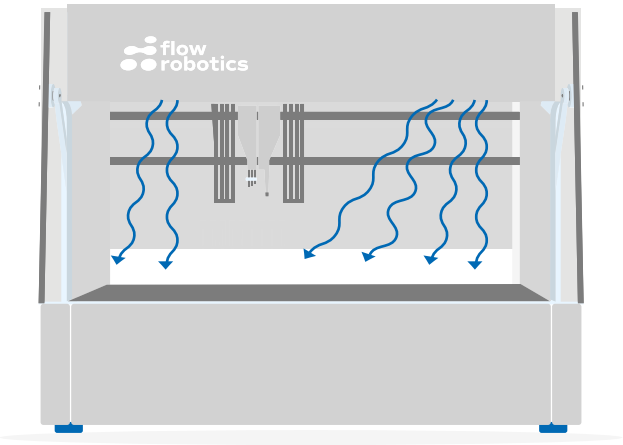


FLOWBOT® ONE

Disinfection option with UV light
User Manual

flow robotics

CONTENTS



INTRODUCTION

This disinfection function is an add-on option for flowbot® ONE. If installed, the UV-C light can easily and quickly make sure your work area and interior of the robot is disinfected. The software makes it easy to control the disinfection.

The UV light is intended for disinfection in an empty robot without spills or other thick layers of material preventing the light from reaching any unwanted cultures.

The system must be maintained as described later in this manual. Service and repaired according to the Service Manual and only by trained staff.
The scope of the system is for an indoor dry laboratory environment, as specified in the Datasheet.

SYSTEM OVERVIEW

The primary element of the system is two UV-C lamps installed in the ceiling of the flowbot® ONE. The lights are controlled in the user interface via the main control PCB in the electronics box and powered via a power supply in the back of the robot. The UV light has its own power inlet in the rear right side of the robot. During disinfection, the pipette modules are moved around to prevent shadows forming and to optimize disinfection of the pipette tip cones.

The lowest irradiation on the work aera is 3 W/m2, and 0.3 W/m2 elsewhere in the robot. On deck, the bulbs provide 5.4 kJ/m2 in 30 minutes

Additional system information can be found in the Data sheet or Technical Files for the flowbot® ONE.

SAFE USE OF UV-C LIGHT

Please observe these important precautions before you use the UV light.

The intensity of the UV light in the robot is harmful to humans and all living things, intentionally. Therefore, the UV light must never be operated with the door open. Under normal circumstances the UV light will be disabled if the door is open. The door itself filters the UV light and therefore provides protection from the UV light during normal operation.

Be aware that a small amount of UVC light can leak around the edges of the door. This is safe for normal use, however, do not place exposed body parts right up against the door edges. Standing a distance of 10 cm or further from the door is fine.

Never look directly into the bulbs when turned on without proper protection, for example the robot door.

The machine has the following built-in safety measures:

- Red stop button on front panel
- Door open/close detection switch to prevent exposure to UVC light if the transparent door is opened

These safety measures should not be circumvented in any way, for example by using the door switch override, or by disassembly of the machine.

Always turn off the light from the User Interface or with the red stop button in front of the robot. Acknowledge the light is off before you open the door.

The reflectors with the UV light bulbs on top of the robot will become warm when in use. Use caution if touching them.

PLEASE BE AWARE OF THE POTENTIAL FOLLOWING RESULTS WHEN USING THE UV LIGHT:

- Discolouration of materials: Long term use of UV-C light can cause yellowing of most materials inside the robot. There is no mechanical deterioration over the expected lifetime of the components. An exception is tip-cone O-rings. These will have no degradation within the regular service interval.
- Smell: Disinfection can result in release of Volatile Organic Compounds (VOCs). This can be used as an indicator the system is running correctly.
- Disinfection of labware is not recommended. This can damage some plastic labware. Labware can cause shadows resulting in uneven disinfection.

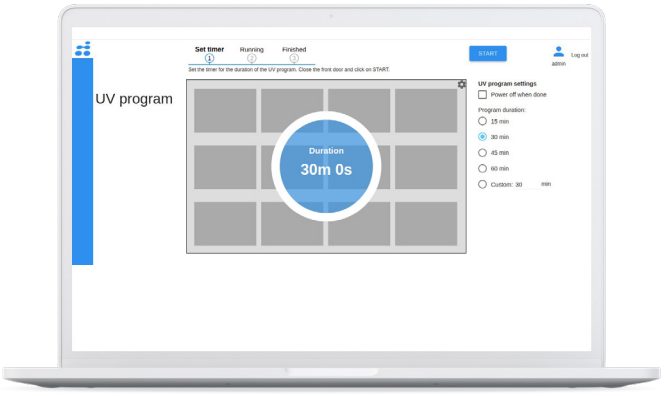
BEFORE YOU START

Labware left in the work area could be damaged by UV-C radiation and will cast shadows preventing optimal disinfection. We recommend clearing the work area before use. Optionally, you can remove the grid on the glass plate for better disinfection of the glass plate.

The UV light is powered by a separate power supply and power cord on the rear right side of the robot. Make sure it is plugged in and turned on.

SETTINGS

Open the UV light menu on the main dashboard. Select for how long you would like to run the UV program from a set of pre-configured durations or enter a custom duration. The default time is 30 min. Always test the disinfection procedure is sufficient for your application. If you want the flowbot® ONE to turn off after the program is done, check the box Power off when done.



RUNNING

Close the door and press START, when you're ready. The robot will home and then turn on the UV light before the time starts counting down.

Visually make sure the UV light is on, before leaving the robot. The robot interior becomes light blue. The pipettes are continually moving while the UV program is running to avoid shadows. When the time has passed, it will turn off the UV light and transition to the Finished state. If Power off when done was checked, it will now turn off the flowbot® ONE.

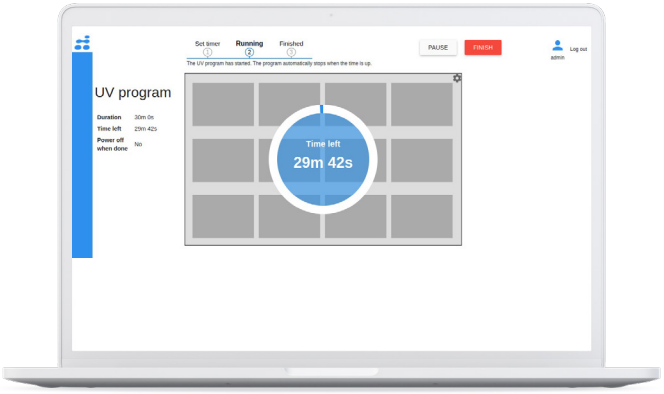
If you need to access the work area while the UV program is running:

- Press PAUSE if you want to continue the countdown where you left off. The robot will move to the nearest corner and the UV light will be turned off. After accessing the work area, close the door, and press RESUME to continue the program.

- FINISH if you want to end the program now. The UV light will turn off.

- If you open the door without pressing any of the above, the program will be paused by default.

The UV light is automatically turned off whenever you open the door.



Note that to ensure the UV program continues even if your PC disconnects from the flowbot network (e.g., due to hibernation), it won't stop the program if you change the URL or go to the main menu. Hence, you won't be able to start another program, while the UV program is running. You will get a warning. If you want to stop the program, press FINISH.

USAGE DATA

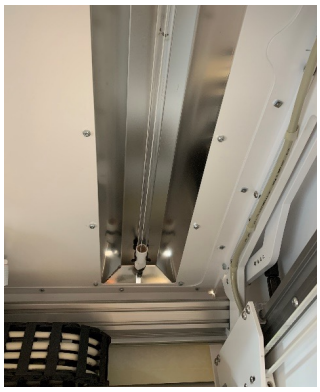
The flowbot® ONE keeps track of how many hours the UV bulbs have been used and how many times they've been switched on. You can see the data by going to Usage Data from the main dashboard and then selecting the UV LIGHT tab.

If you want to see exactly when the light has been switched on and off recently, you can see this in the log. Go to Log from the main dashboard, enter Code 123 and press FILTER. Now, you can see a list of time stamped events for when the UV light has been turned on or off. Note that the oldest log entries are deleted whenever the log grows too big – it will usually hold a few months' worth of data, but this varies depending on use.

MAINTENANCE

The UV light requires very little maintenance.

- Checking the bulbs regularly.
- Minimum a yearly cleaning
- Bulb replacement, See Datasheet for interval details. See bulb replacement procedure in the Service Manual.



Bulb in reflector

Holding UV bulb with glove

CLEANING

Regularly check the UV-C lamps for dust or dirt; if dirt is present, it could inhibit the UV function. For light dust, a dry cloth or vacuum cleaner with a brush nozzle can be used. For more heavy dirt, follow the annual cleaning instructions below.

ANNUAL CLEANING

Minimum once a year the two bulbs should be cleaned to prevent dust and grease from reducing the irradiation.

Do not clean right after the UV light have been in use. Wait for the bulbs to cool down. Turn power off on the rear right switch. Move the pipettes to the rear and centre for access.

Wear gloves to prevent fingerprints on the glass. Use isopropanol or a normal pH neutral cleaning agent in water and wipe the bulbs carefully with a hard-wrung cloth. The bulbs can be removed from the clips for easy access. Grap on the ends of the bulb and pull down – first in the front and then in the rear. Leave the rear end connected. Hold on to the bulb. It is not secured in the connector. Also check the glass for cracks or other damage.

SPILL

If the bulb accidently breaks, be aware it contains very small amounts of mercury, and should be handled like any other light rods. Follow listed precautions and always observe local regulations:

- Evacuate people and animals from the room.
- Ventilate the room for at least 15 minutes before starting the clean-up.
- Use protective equipment such as gloves and safety goggles.
- Pick up the broken pieces and dirt with two pieces of cardboard or similar.
- You can use tape to pick up small pieces.
- After cleaning up, clean the area with a damp cloth or towel to remove small particles.
- Collect all remains in a sealed container and dispose of as special waste (recycling site).

DISPOSAL

The UVC Light System is subject to the 2012/19/EU WEEE Directive and must be sorted and disposed of as Electrical Waste.

The UVC lamps contain Mercury and must be disposed of in a specialised disposal facility, as well as following any other relevant regulation regarding the disposal of Mercury.

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